

GOVERNMENT OF NORTHERN IRELAND
MINISTRY OF AGRICULTURE

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Research and the Farmer.

VII. PLANT PROTECTION.

The science of plant protection is concerned with all those aspects of knowledge which by their application assist towards the ensurance and preservation of health in farm and garden crops. Economically, it operates whenever a crop ceases to yield the quantity and quality of produce which may be normally expected from its cultivation. It seems scarcely necessary to emphasise the need for keeping abreast with recent developments which are taking place in this field of study and research, or to stress the importance of undertaking active research for the purpose of assisting in the continuous fight which has to be waged against disease.

The lesson learned from the famine of the eighteen forties brought about by the sudden onset of potato blight, the recollection of which has only just passed from living memory, is convincing of the desirability for being as prepared as possible to deal with any emergency which may arise. Next year will be the centenary of that event which caused the death of upwards of a quarter of a million people and forced a million others to emigrate. Nor does it seem as if the battle against disease is being fought to a standstill.

The greater ease with which plants and their products can be transported throughout the world; the breeding of new varieties more bountiful in their yield but frequently susceptible to disease; the planting of huge acreages under the same crop; the employment of continuous cropping coupled with intensive methods of cultivation and manuring—all these things quicken the incidence of disease and tend to create new problems demanding solution.

Crop Hygiene

In planning measures to be taken for the prevention or control of disease, the consideration of plant hygiene must take pride of place. In other words, the more effectively health can be maintained by good farming and gardening and without the aid of sprays and disinfectants the better, although

it will be seen that the use of these materials in routine farm and garden practice is often essential, no matter how high a standard of crop husbandry is attained. Nevertheless, good crop husbandry must be accepted as the starting point in the build up of healthy crops and any other measures necessary to maintain health must be regarded as ancillary.

That much can be done by good farming, coupled with a working knowledge of the conditions likely to induce disease, is well illustrated by the following examples :—

- (1) A big proportion of potato tubers which become infected with blight during the growing season are those which lie exposed or nearly exposed in the drill. This is explained by the fact that the infection is caused by spores falling from the diseased haulms. As these spores can only germinate and become infectious in the shallow top layer of the soil, it follows that those tubers covered with a protective layer of earth are comparatively safe. Effective earthing up of the crop will, therefore, do much to alleviate such damage.
- (2) Infection of the tubers with blight at the time of digging will be almost negligible if the haulms have been dead for some 14 days before lifting the crop. The blight fungus cannot survive on the dead potato plant and, by that time, no living spores capable of infecting the tubers will remain.
- (3) Crops making lush and rank growth are most susceptible to blight attack. Well balanced manuring, avoiding the application of an excess of readily available nitrogen, will, therefore, assist in reducing the intensity of the attack.
- (4) Dry rot of the potato tuber, where it does not follow an attack of blight, is apt to occur when the tubers have been bruised or roughly handled at the time of lifting. This is particularly so in the case

of early varieties and much may be done to avoid the subsequent occurrence of dry rot in the stored tubers if sufficient care is taken to prevent bruising and damage during lifting and handling.

- (5) As flax rust is always likely to be most severe in late sown crops grown in rich soil, this may be countered by practising earlier sowing and avoiding rich lea ground or land likely to produce soft, lush growth.
- (6) Frost damage to plantation crops such as apples may make an orchard quite unprofitable. The only satisfactory means of avoiding this is by the careful selection of a site where frost attack is unlikely. This is usually quite practicable and is of the greatest importance in the case of a crop which may occupy the land for upwards of half a century.
- (7) Tomato leaf mould is as serious a problem in tomato cultivation as blight is with potatoes. It is necessary to spray the crop in order to keep the disease under control but much may be done to assist by commencing with a clean house free from contamination with spores, by not planting too closely, by thinning the foliage to allow of effective aeration, and by the adjustment of ventilation and temperatures.

In the past insufficient attention has been given to the study of crop growth requirements in so far as they affect the health of the plant and a greater concentration of research into growth conditions and methods of cultivation, together with an intensive study of the life history of the parasite when ill health is the result of parasitic attack, should assist materially towards the attainment of healthier crops through the medium of crop husbandry. Hygienic measures employed in the counteraction of disease may not be spectacular but if it is assumed that through a little extra care blight can be prevented from affecting 1 cwt. of potato tubers per acre, this represents a saving of 8,000 tons in a crop of 160,000 acres.

The Disinfection of Seed

The role of the seed as a vehicle for the carriage of parasites responsible for crop diseases is becoming of increasing importance. Smut diseases of cereal crops provide the classic example, but there are now few crops where one or more of the parasites responsible for major diseases are not known to be seed borne. The most spectacular development in this phase of plant pathology has been the discovery of compounds of organic mercury which when applied to the seed destroy the parasites which may be present, without adversely affecting its power of germination. These compounds are usually applied in the form of fine dusting powders, some 2 oz. of which is required to treat a bushel of cereal seeds. Apart from preventing smut diseases of oats, such treatment controls leaf stripe which is a seed borne disease widely distributed in Northern Ireland. The results of a series of field experiments carried out over a number of seasons show that the effect of seed treatment generally applied is to raise the grain yield by some 8 per cent. or by from 1 to 2 cwt. per acre. Calculated on an acreage of 300,000 this means an increase of more than 15,000 tons of grain without sowing one extra acre. The cost of sufficient material for the treatment of seed for one acre is less than 2/6d.

The flax crop provides another excellent example of how seed disinfection can be employed to prevent epidemic outbreaks of disease through seed borne parasites. During the 1914-18 war, seed borne diseases were responsible for widespread crop damage and, had no measures been taken to deal with the problem, equal if not greater havoc would have been wrought by them during the recent war years. Seedling blight presents one of the worst problems in Northern Ireland and in 1939 a new disinfectant was found which provides complete control of this disease. At the same time it gives a fair measure of control of stem break and browning, as well as certain other seed borne diseases of the crop.

This discovery, which was made in Northern Ireland soon after the outbreak of war, has been applied during the time of the recent emergency when all flax seed produced in the United Kingdom has been treated with the disinfectant. The all-in cost of treatment does not exceed 2/6d. per acre and from carefully conducted trials it has been estimated that by this means some £2,000,000 worth of flax has been saved in the United Kingdom during the past four years.

Further research into the problems presented by seed borne diseases and their control will undoubtedly lead to the discovery of even better disinfectants and other methods whereby healthier crops may be harvested and increased yields obtained without having recourse to extra planting.

The Disinfection of Soil

In the case of glasshouse and nursery crops, where short crop rotations and intensive cultivation make crop diseases caused by soil borne parasites of particular importance, the partial sterilization of the soil by the use of steam or chemicals has become recognised as necessary. There are now few large nurseries in Northern Ireland which do not possess modern equipment for the steam sterilization of the soil, an operation which has passed from the experimental stage to become adopted as routine practice. The use of a solution of mercuric chloride for local disinfection of the soil around the roots of *Brassica* plants has become a recognised practice for controlling club root disease in many market gardens.

The Spraying of Crops

Spraying growing crops for the preservation of health and protection against disease is becoming of even wider application. New and improved spray materials which, besides being more effective, simplify the operation for the farmer and gardener and are less liable to cause crop damage, appear regularly and there is little doubt that further research will lead to more discoveries and bring about greater improvements. Although Burgundy mixture has served well for more than

40 years and still remains the greatest offensive weapon against potato blight, it is not unlikely that its use will eventually be superseded by improved materials of greater ease of preparation and application. Spraying the potato crop against blight in Northern Ireland means an average increase in the tuber yield of 30 cwt. per acre or an annual saving of 240,000 tons of tubers in an acreage of 160,000.

Had it not been for the introduction of a planned spraying calendar for apple orchards in the late nineteen twenties it is unlikely that apple growing as an industry would have survived in Northern Ireland. Apple scab was becoming epidemic throughout the Co. Armagh and Co. Antrim orchards and it was only by the introduction of regular spraying with Bordeaux mixture that its ravages were controlled. Spraying programmes adopted in Great Britain and elsewhere were found to be quite unsuitable for local conditions and the problem was eventually solved by intensive research carried out at home. Bramley's Seedling apples of unsurpassed quality can be produced locally, provided the crop is well protected from disease, and some idea of its possible value is obtained when it is realised that more than £1,000,000 worth of fruit was shipped to Great Britain in 1944-45. Much more experimental work, planned with the object of finding more effective sprays and testing them for their efficiency, is necessary if the yield and quality of the crop are to be still further improved.

Satisfactory sprays for the control of American gooseberry mildew have been found and, if the bushes are sprayed in accordance with these findings, it is now no longer necessary to burn them in an attempt to control the disease.

Leaf mould may become a limiting factor in the cultivation of tomatoes and the introduction of effective spray materials for keeping this disease in check has been decisive in the successful cultivation of the crop.

Perhaps there is as much scope for the improvement of spraying machinery and methods of spray application as

there is for the improvement of the sprays themselves. The increasing benefits conferred by mechanisation on the farm will also apply to spraying equipment, and improvements in this direction should do much to add not only to the effectiveness of the spray but to make the operation of spraying less arduous and distasteful.

Disease resisting Varieties

The breeding and growing of varieties of crop plants which resist disease is yet another method of attack employed in plant protection and the most outstanding instance of the success of this method is exemplified in the case of wart disease of the potato. Here varieties occur which are so-called immune and which can be grown under highly infective conditions without contracting the disease. No other economic method of protecting the potato crop against this disease is known, so that had immune varieties not been discovered, epidemic outbreaks of wart disease would have constituted a very serious menace to the continued cultivation of the crop. The matter is so important that no new variety is allowed to be introduced into commerce until it has been proved not to contract the disease under conditions of stringent test. But the solution of problems of this kind is not often so simply and lastingly achieved for it is not always an easy matter to incorporate disease resistance with good quality. In the case of potato blight, varieties of the potato have been produced which almost completely resist the disease but their quality has not reached the standard which would allow them to compete successfully with those in everyday use showing little or no resistance to blight. Nevertheless, a big step forward will have been made if it is found possible to produce varieties of good quality incorporating high disease resistance.

The urgency of breeding for disease resistance will to some extent depend upon the effectiveness and practicability of alternative methods of disease control. When such are available it is possible to concentrate upon breeding for yield and quality knowing that the

health of the crop can be safeguarded by other means. Some varieties of crops possess such outstanding good qualities that they are grown in spite of their susceptibility to disease. For instance, the Arran Banner potato is very susceptible to blight but its cropping qualities are such as to have led to its continued cultivation, the farmer preferring to take vigorous control action against blight. As a fruit to be desired the Cox's Orange Pippin apple is delectable but the health of the tree must be jealously guarded if growth conditions are not just suitable and good crops are to be produced.

When no other method of disease control is known the breeding of resistant varieties becomes more urgent; this is exemplified in the case of rust diseases of cereals, where substantial progress has already been made, and it is not unlikely that the solution of the problems presented by flax rust and wilt will best be solved in this way. The greatest urgency of breeding for disease resistance occurs where a specific disease is of such a nature as to make the growing of a particular crop almost impossible, and where no other method of disease control is known. Red core root disease of the strawberry is a case in point and, in Scotland, strawberry varieties have already been produced which can be grown well under conditions where the cultivation of susceptible varieties results in complete crop failure. It is true that the quality of the fruit produced by these resistant strains is still capable of improvement but this is a case where the problem of disease is so acute that breeding for resistance must temporarily outweigh the consideration of quality.

The successful solution of a problem at one particular centre of research may not be universally applicable and the varying climatic conditions under which any particular crop is grown may necessitate the undertaking of research locally. Again, breeding for resistance to one disease may lead to the production of a variety susceptible to another or the new variety may fall victim to a new disease unknown in the varieties

already established. In the course of time even the nature of the parasite may change and allow it to attack varieties hitherto resistant. Thus it is that the problem of breeding for disease resistance is beset with difficulties and complications but, nevertheless, the work is of great and growing importance. It is slow and unspectacular and will have to be pursued relentlessly with great patience for so long as man possesses the desire to improve upon the fruits of the earth and change the balance of nature to meet his own particular fancy.

Virus Diseases

Perhaps no development in the study of plant pathology during the last quarter century is more fascinating and intriguing than that dealing with the study of crop virus diseases and their control. Today it is believed that the sole reason for the degeneration or "running out" of potato varieties is due to their becoming infected with one or more of the viruses which are liable to attack the crop and set up disease. This also holds for some of the soft fruits such as strawberries and raspberries.

When once a plant has contracted infection, the virus usually spreads throughout its entire system and this is why in crops such as potatoes, strawberries and raspberries which are propagated vegetatively, the whole stock raised from infected material becomes affected with the disease. It is doubtful whether the virus can be transmitted through the true seed of the plant so that in the case of crops propagated by seeds the spread of infection through stocks from season to season seldom occurs.

The ways in which the virus is spread from plant to plant in a growing crop are of special interest, although in many instances they are not yet properly understood. In extreme cases the virus principle may be so infectious that a healthy plant will become contaminated if its leaves happen to rub up against those of an infected neighbour; this is exemplified by the virus which causes simple mosaic disease of the potato. Frequently the

virus is carried by an insect vector and usually one particular species of insect is responsible. One of the commonest species of green "fly" which frequents the potato is responsible for spreading leaf roll and leaf drop streak viruses.

Apart from aiming at the control of the insect vector where the virus is spread in this way, no method for the protection of crops is known other than the raising of healthy stocks and ensuring their remaining uncontaminated. The checking of the responsible insect vector may be helpful but the main line of attack lies in the introduction and maintenance of virus-free stock.

In so far as the potato crop is concerned Northern Ireland enjoys a peculiar advantage which is now generally recognised and which, when fully developed, should lead to this country becoming one of the leading areas in the world for the production of healthy, virus-free stocks of seed potatoes. The cool, damp and windy climate of its more northerly latitudes make conditions unsuitable for the epidemic occurrence and spread of the green "fly" responsible for carrying some of the viruses which cause the major diseases of the crop.

So, in effect, climatic conditions have provided a natural and wholesome check on the insect vector. This facilitates the building up of disease free stocks and very satisfactory accounts have come from warmer and drier countries where seed potatoes from Northern Ireland have been grown with great success. In such countries the conditions for the spread of major virus diseases are frequently ideal and it is impossible to continue growing potatoes successfully without obtaining frequent changes of seed from such an area as Northern Ireland where the spread of viruses can be more readily controlled. That this privilege is a very real and local one is indicated by the fact that in an area so near as southern England a change of seed may be necessary at least every other year.

The study of virus diseases and the prosecution of virus research is, however, not quite so simple as may appear

from the foregoing, and the facts upon which present day knowledge is based have been formulated only after years of arduous investigation and experimental work. When it is suggested that some varieties of potato carry virus infection without showing any symptoms, that different varieties of the potato which do show symptoms react to the infection in different ways, and that complicated symptom pictures may be built up in plants infected with a virus complex or a number of viruses, then some idea is gained of the intricate nature of the work.

Apart from research into the nature of the infectious virus particle, which is believed to be of protein-like structure and is much smaller than any known germ or bacterium, much needs to be done in the further study of the diseases themselves and in the modes of their transmission, while the development of reliable methods of testing stocks for infection is a real need in the approach to the problem as it applies to everyday practice. The further development of such work, in consort with the measures taken in the field to propagate and maintain healthy stocks, should serve not only to maintain but to increase the reputation of home-grown seed potatoes.

Similarly, much needs to be done along parallel lines for the stocks of soft fruits and other horticultural crops if this branch of rural industry is to develop and assume the place it deserves in the national economy.

Deficiency Diseases

To this group of ailments belong those which become apparent when one or more of the essential crop food constituents are lacking or non-available. They may be closely linked with certain soil types or brought about by poor farming, while in times of emergency

when intensive cropping is necessary and where marginal land has to be taken into cultivation they are apt to become of greater significance.

The importance of good farming and sound crop husbandry in avoiding their occurrence is obvious, although abnormal seasonal conditions, such as unexpected drought periods, etc., frequently play an important part in determining their occurrence. Much is being done to determine their specific causes and effect their control and the following two examples indicate something of the progress which has been made within recent years :— Brown heart disease of swede turnips has been shown to be due to the lack of a trace of available boron in the soil and it may be completely prevented by the application of borax to land in which it occurs; its occurrence is aggravated by liming but in this case also the crop may be protected by the use of borax. Grey spot of oats results from a deficiency of available manganese and may be prevented by spraying the crop with a dilute solution of a manganese salt.

Research and experimental work dealing with plant protection has already provided a wealth of information which when applied is invaluable in preserving the health of crops, and there is little doubt that further research will provide the keys to many of the problems still awaiting solution. At the same time the fullest results from this work can only be expected where the practitioner has some working knowledge of the principles involved and when treatments are applied intelligently; a higher standard of general knowledge with respect to crop husbandry and plant protection should, therefore, do much to ensure that the full benefits made available by research are realised.

Specialised Farming.

IV. CERTIFIED SEED POTATOES.

Up to about fifteen years ago, the production of seed potatoes of a high standard of health and purity was a branch of farming that was practically unknown in this country. Since that time, and more particularly since 1939, many farmers have become specialists in this branch of tillage farming and the tonnage of high quality seed produced this season will probably be in the region of 120,000 tons.

Many of the soils of Northern Ireland have long since been proved to be very suitable for potato growing. In fact, the potato crop has always been one of our most important tillage crops. It was not until about 1938, however, that any appreciable number of growers began to realise that this country, chiefly by reason of its climatic conditions, was ideal for the production of healthy seed potatoes. When this did eventually become common knowledge, it is not surprising, bearing in mind the substantially higher return from seed potatoes than for ware, that the number of growers of seed increased very rapidly.

Figures, giving the acreages of seed certified and the tonnage shipped during 1939, compared with the acreage certified this season and the estimated tonnage for shipment, demonstrate very clearly the rapid increase in production. Of the 1939 crop, just under 13,000 acres were certified for seed and about 18,000 tons of seed were shipped, whilst about 42,000 acres were certified this season, and it is estimated that, after the home seed trade has been satisfied, there will be about 70,000 tons of seed available for shipment.

A large proportion of the seed shipped goes to England, but the trade with foreign countries is, at present, also considerable. There appears to be a practically unlimited demand for high quality seed of the right varieties, so that many more farmers who now grow only for the ware trade would be well advised to change over to seed production.

Up to the present, a large part of the increased production has tended to come from areas that were always noted for potato growing. The Dungiven district is one such area and the rapid increase in production there is fully demonstrated by the fact that, in 1939, only about 50 acres were certified as stock seed, while, during the present season, the acreage is 640. As in other parts of the country, there are now, in this area, quite a few very competent seed potato producers. One of the best known of these, and a true pioneer in the propagation and production of high quality seed potatoes, is Mr. G. Craig, Gilkey, Tullintrain, Claudy.

Mr. Craig's farm is about 55 acres in extent and is practically all arable. In addition, he takes about 15 acres in conacre each season. The soil, which is fairly typical of the district, is a free-working, well-drained, medium loam, very suitable for potato growing. The typical six or seven course rotation of this country is followed, the potato crop being taken after lea oats. Although oats and flax are grown, by far the most important crop in the rotation is the seed potatoes and Mr. Craig can rightly be described as a specialist in the production of this crop.

About 15 to 18 head of cattle are usually kept. Three of these are dairy cows and the remainder young stock the most of which are fattened either in the house or on the grass.

History of the Seed Potato Production

Years before the seed trade developed, Mr. Craig was a noted producer of ware potatoes with a usual area of from six to eight acres each year. Shortly after the Ministry's plots, for the propagation of pure, high-quality seed potatoes, were established at Dungiven, he obtained a bag of Up-to-Date seed from this source. Twelve years ago the first crop on the farm that was certified and sold for seed was grown from the produce of that

bag. From that time onwards, the acreage of potatoes was increased and new varieties, for which there was a good demand, introduced. Since stock seed was introduced into the Dungiven area, Mr. Craig has not planted any potatoes below stock seed standard. In fact, up to the present, he has never had a crop that did not come up to the standard required for a stock seed certificate. In the present season, $13\frac{1}{2}$ acres were under potatoes and the following varieties were grown: Arran Pilot six acres, Ulster Chieftain $1\frac{1}{2}$ acres, Arran Victory two acres, Arran Peak one acre, Sharpe's Express one acre, Gladstone one acre, Arran Banner half acre, Kerr's Pink half acre.

Origin and Propagation of the Seed

No fresh seed is ever taken into the farm except from the Ministry's plots at Dungiven. To use Mr. Craig's own words in this connection "I might well get very good seed if I purchased from other farmers, but I couldn't afford to take the risk of buying seed that might give a crop not up to stock seed standard."

On alternate years, from one to one and a half cwt. of each variety is taken in from the plots. These fresh stocks are all grown in isolation from any other potatoes on the farm and from them the seed for planting the following year is obtained.

The usual practice is to grow any particular stock for only three years. Here again, this is largely a precautionary measure taken to ensure that everything possible is done to prevent any crop not reaching the standard required for a stock seed certificate. This will be obvious when it is considered that in the Dungiven district, because of its somewhat exposed situation, a high proportion of stock seed could easily be maintained at stock seed standard for at least six years, provided the usual precautions of isolation, etc. are taken.

The soundness of Mr. Craig's methods of selection is reflected by the fact, as mentioned above, that he has never been refused a stock seed certi-

cate and even more so by the fact that all his crops are classed as "selected" stock seed. This special designation is given only to crops that, in addition to being 100 per cent. pure and free from visible signs of virus disease, have a special vigour well above the average.

The Growing of the Potato Crop

Mr. Craig is a firm believer in the value of selecting his seed early in the season so that the first sprouts produced can be retained. He is very much against the practice of allowing the tubers to produce weak, spindly sprouts, which have to be removed before the tubers are set up to sprout.

He believes in giving the potato crop a good dressing of farmyard manure which he ploughs into the stubble ground at the rate of about 15 tons per acre around the New Year. When asked for his views on the alternative practice of applying the manure to the drills in spring he replied that it required too much labour at a time when labour was already short, to do this and also, in his opinion, much of the value of the manure was generally lost due to drying out before the drills could be "closed." As sufficient farmyard manure is not produced on the farm to meet the requirements of the area of potatoes grown, Mr. Craig is fortunate in that he is able to purchase up to 100 tons of manure each year from a neighbouring dairy farmer.

The land is prepared in the usual manner in spring, and shallow, 26 inch drills opened with a Ford Ferguson tractor. Mr. Craig prefers to open shallow drills rather than to saddle harrow them, as is the practice of some farmers who plough in farmyard manure. His reason for this is that the seed can be planted at a much more uniform depth and in straighter rows if they are placed directly on the bottom of the track made by the drill plough than would be the case if the tops of the drills are first harrowed into this track. It should be noted, however, that his soil suits the system adopted, and that, on farms where the soil is heavier, it would be advisable to open the drills

the same depth as if farmyard manure were to be applied in the drill and then saddle harrow. This will ensure better drainage on heavier soils and provide a loose bed for the developing plants.

A dressing of at least 10 cwt. special potato manure per acre is applied to the drills at planting, and usually a light dressing of a nitrogenous fertiliser is applied to the bottom of the furrows at hoeing time, before earthing up is done.

The seed is spaced about 9 or 10 inches apart. Where cut sets are used, care is taken to ensure that the cut surfaces do not come in contact with artificial manure. Mr. Craig's view is that there is not really much to choose between the use of whole seed and cut sets for planting, except that, under adverse conditions, whole seed are more certain to grow and produce a good crop than cut sets.

The usual operations of saddle harrowing, grubbing, hoeing, moulding, etc., are carried out, all work, except spraying, being done by tractor.

Two sprayings of at least 120 gallons per acre of full strength Burgundy mixture are always given. The first is applied early in July and the other about two or three weeks later.

Mr. Craig has experienced very little trouble due to blighted tubers even in years like 1944 when blight disease was so widespread. His views, with regard to the prevention of blight, are that by far the most important single factor is that the seed planted should be as free as possible from blight. This is another reason why he propagates his own seed. He is very careful to exclude any cut set that shows any sign of blight. He also looks over all his seed very carefully soon after they are set up to sprout and picks out any that sprout prematurely, particularly if they produce thin, weakly sprouts. Such tubers are almost certain to be affected with blight. It should be noted that Mr. Craig's ideas regarding blight are very sound, as it has been proved that blight is carried over from year to year in blighted tubers. However, no matter how much care is taken, some blighted tubers will always be planted so that early efficient spraying is essential.

Yields

The suitability of the soil for potato growing and the high standard of cultivation of the crop are well demonstrated by the yields obtained. Mr. Craig's average yield of saleable seed potatoes has been at least 10 tons per statute acre, and the usual quantity of ware and chats unfit for sale as seed is less than one ton per acre. In good potato seasons, the yields are much higher than this average. In fact, the cup presented by the Potato Marketing Association for the best crop in Northern Ireland was won in 1939 with an estimated crop yield of 27½ tons per statute acre of Arran Peak. In the same year and in the following two years, the cup, presented by the Young Farmers' Clubs for competition amongst potato growers in Northern Ireland, was also won.

Dressing and Disposal

Soon after the crop is dug, a start is made with the picking of the seed for sale. The first part of the operation consists of passing the tubers over a potato sorter. This separates the ware from the seed size tubers. The seed are then passed down a chute and carefully picked. Mr. Craig, as far as possible, makes a point of being present to supervise the final picking operation. Evidence of the care taken is provided by the fact that never yet has a consignment of seed been rejected for faulty dressing or for any other cause.

Mr. Craig has deservedly acquired an excellent reputation for his seed potatoes. He receives orders for seed from all over Northern Ireland and usually has far more orders on hand than he can cope with. He has not, so far, had any seed for sale for shipment.

The key to Mr. Craig's success is to be found in the keen interest he has shown to acquire knowledge regarding the growing of first class seed and the application of that knowledge with all possible care and thoroughness. Take, for example, the sound knowledge he shows and the care he takes over the selection of his own seed to ensure that it is as free as possible from disease.

Equal care is taken to ensure that the different varieties are not mixed. If two white varieties have to be planted in the same field, they are always separated by a considerable area of a coloured variety. In addition, not more than one variety is ever stored in one house in case they might get mixed by rats or some other means.

The final evidence of his keenness, however, is to be found in the fact that, so far as the roguing of the crops and the recognition of virus disease are concerned, Mr. Craig has reached a proficiency that compares favourably with that of those who have made a special study of potato varieties and potato diseases.

Tractor Ploughs and Ploughing.

During the war the increase in the arable acreage, coupled with the shortage of labour, created a demand for a speedier means of carrying out tillage operations than was provided by horses. As a result, and limited only by the supply position, the mechanisation of the farms of Northern Ireland has steadily continued until at present by far the greater proportion of tillage work is being done by tractors and tractor implements. That is why it is so essential that tractor ploughing should be of the highest possible standard.

The ploughing of the land is the basic and principal operation in tillage, and the importance of having it done well cannot be too strongly impressed upon farmers and ploughing contractors. The higher the quality of the ploughing the less costly and the easier will be the subsequent cultivations, and the better the prospects of obtaining good crops. This is particularly true in the case of lea land, especially that which is hidebound and covered with old matted foggage.

Reasons for Ploughing Early

Generally speaking, the earlier in the season the ploughing is done the better will be the results obtained. Most crops do best on a stale furrow. Ploughing immediately before seeding is bad farming. This is especially so in the case of heavy clay soils. Land ploughed early in the season obtains the beneficial effects of weathering agents, such as frost, snow, etc., and the subsequent preparation of the seed-bed in spring is thereby made less difficult and much less costly.

Farmers employing hired tractors to do their ploughing will experience less

difficulty in obtaining the services of a contractor early in the season than later, and the charges are less than they will be later.

Lea land intended for ploughing should be heavily stocked in the late autumn in order to reduce surface vegetation to a minimum, and rushes and other tufted vegetation that remain should be cut and removed before ploughing is commenced. Lea fields, especially those carrying a mat of foggage, should be ploughed not later than mid-December. This is necessary to provide ample time for the vegetation to decay and for the furrows to become consolidated. If the ploughing of such land is postponed until later the turf will not have had sufficient time to decay, and loose, poorly-consolidated furrows, which will dry out in spring and lead to poor brairds, are inevitable. Evidence of such conditions was only too common last year and was provided by the many poor brairds of lea oats seen throughout the country on late ploughed land.

Grain crops and potatoes revel in decayed vegetation, and if maximum yields are to be obtained early ploughing is essential to give the turf plenty of time to decay. Consolidation of the furrows will also have taken place, while the beneficial effects of the weather will have mellowed the up-turned soil, thus rendering the preparation of the seed-bed a less arduous task, and providing the firm tilth which is conducive to successful growth in the early stages of a cereal crop.

While the modern tandem disc-harrow is undoubtedly one of the most useful tractor drawn tillage implements on

the farm, its use cannot be expected to provide a good tilth irrespective of the quality of the ploughing and the time at which it was done.

What Good Ploughing Means

Good ploughing is that in which the following conditions are fulfilled:—

- (1) The furrows should be of uniform width and depth, straight from end to end, turned well over, and tightly packed. The "ins" and "outs" should be uniform and neat, and the bottoms of the furrows cut clean and even.
- (2) All surface vegetation such as grass, weeds and stubble should be completely covered; there should be none of it showing between the furrows, and no unturned soil. If farmyard manure is being ploughed in, it too should be completely buried.
- (3) The ploughed land should be level on the top throughout. The "backs" should not be higher than the rest of the ploughing and the "hintings" should be quite shallow and as narrow as practicable.
- (4) Soil conditions should be produced by which the cultivations required for the preparation of a suitable seed-bed are reduced to a minimum. This means that the furrows should be well crested with soil.

Generally speaking, those who are efficient ploughmen with horse drawn ploughs readily attain a high degree of skill as tractor ploughmen. This would tend to indicate that the correct setting of the plough and the hitching of it to the drawbar of the tractor so that it falls into the correct line of draught, are the real secrets of success in tractor ploughing.

Most tractor ploughs used in Northern Ireland are of the three-wheeled, two-furrow type, fitted with a self-lifting mechanism for raising or lowering the plough at the headlands. Depth control and levelling adjustments are done by levers or screw mechanisms. Some tractors, however, are specially designed so that wheel-less ploughs can be attached directly to them.

The lifting mechanism is incorporated in the tractor to control the depth of ploughing and to lift the plough at the headlands.

Marking out the Lea Field

The operator should first study carefully the lay-out of the field to be ploughed and then mark it out so as to reduce to a minimum the time wasted in idle running and in awkward turning. Headlands should be at least 7 yards wide for a two-furrow plough and 8 yards wide for a three-furrow plough, in order to facilitate easy turning and to ensure that the plough leaves and enters the land straight. Curved ends of ploughed furrows are unsightly and make the finishing of "lands" much more difficult.

To ensure neatness the "scratch" marking out the headlands should be turned towards the centre of the field by the rear body of the plough. The normal width of land between "backs" for a two-furrow plough is 22 yards. It is customary to make the first "back" parallel to the longest side of the field and 11 yards from the headland "scratch". All other "backs" should be made parallel to the first one and all "backs" should be made before the main ploughing is commenced. Similarly, all "hintings" should be left until all the ploughing of the field, except the headlands, has been completed. By doing so the "backs" can be made and the "hintings" lifted with the minimum number of settings and with the least possible waste of time.

An experienced ploughman finds no difficulty in stepping off accurately the distance between one "back" and the next, but those who are inexperienced would be well advised to use a tape or strong piece of twine for this purpose.

The headlands should be ploughed by going round the field. In the case of lea land it is usual to turn the furrows towards the centre of the field.

When ploughing stubble land following lea, the "backs" should be made at the "hintings" of the previous year's ploughing and the headlands ploughed away from the centre of the field.

Plough Settings

Faulty setting of the plough and incorrect adjustment of the hitch are the direct causes of bad ploughing, and indirectly increase considerably the draught on the tractor.

The drawbar should be so adjusted that it falls into the line of draught parallel to the furrow. This is a particular adjustment that requires practice to make correctly, but as all tractor ploughs are provided with a wide range of adjustment the correct position can readily be attained by trial.

Disc Coulter : Incorrect setting of the disc coulters is a very common fault. The function of the share or sock is to make a horizontal cut, while that of the disc coulter is to make a vertical cut on the landward side of the furrow. For average ploughing conditions the disc coulters should be set with the centre of the disc directly above the point of the share. The lower edge of the disc should be about 1 inch above the share and approximately $\frac{1}{2}$ inch to the land side of the share. The stem of the coulter should be attached to the plough beam sufficiently far forward to ensure that the disc makes a vertical cut before the mould-board commences to turn the furrow over.

When ploughing grassland it is advisable to set the disc with a slight amount of undercut. If the land is very hard it may be advantageous to use knife edge coulters instead of disc coulters in order to ensure that the plough is kept down into the land, as the action of disc coulters tends to lift the plough upwards.

Skim Coulter : The function of the skim coulter is to pare off a shallow layer of soil in front of the main body and turn it into the bottom of the previous furrow. The strip of soil removed by the skim should never be more than from $\frac{1}{4}$ -inch to $\frac{3}{4}$ -inch thick and about $1\frac{1}{2}$ inches wide. If deeper skimming is practised it will be impossible to pack the furrows tightly. The skim should be so adjusted that the strip of soil removed by it is turned into the bottom of the previous furrow before the oncoming furrow commences to turn over.

Generally it is found in practice when ploughing down farmyard manure, or lea land on which there is a lot of rough surface vegetation, that skim coulters are more of a hindrance than a help. Indeed under such conditions better results can often be attained by removing the skim coulters altogether and tilting the disc coulters slightly to the land side of the furrow.

Rear wheel of Plough : The rear wheel is designed and attached in order to facilitate the turning of the plough at the headlands, and to act as a transport wheel when moving the plough from field to field. It is not intended to support the plough while at work, and it should, therefore, be so adjusted that it rides freely on the bottom of the furrow.

Depth of Ploughing

It is impossible to prescribe any precise depth for ploughing. So much depends on the nature of the soil and the crops to be grown that the farmer is in the best position to decide on the most suitable depth. Generally speaking, however, the depth of ploughing is determined by the following factors:—

- (1) The nature of the soil. Heavy soils should be ploughed deeply and early, in order to obtain the maximum advantages of weathering agents. Light soils may be ploughed shallower and later.
- (2) The nature of the subsoil. If the subsoil is composed of "till" or other infertile material it would be wrong to plough so deeply that this would be turned up.
- (3) The crops to be grown. For root crops the soils should be ploughed more deeply than for cereals and flax.
- (4) The time of ploughing. If arrangements can be made to plough early in the season, as every progressive farmer should do, deeper ploughing can be practised. By ploughing suitable land deeply, fresh soil will be brought to the surface and the weathering agents, frost, snow, sun, rain and wind will break the soil down to a fine tilth in readiness for the preparation of the seed-bed in spring. If, as a result of some

unavoidable circumstances, ploughing has to be postponed until late in the season then shallower ploughing may give better results.

Ploughing at the same depth year after year is bad farming. When ploughing is done at the same depth season after season, especially of the heavier soils, a hard, impervious layer, or "pan", is formed by the sole (bottom) of the plough. This layer will greatly impede drainage and prevent the free circulation of air around the roots of the growing plants. Where land is put through a normal rotation, which includes a root crop, the possibility of a "pan" or hard layer being formed is greatly reduced as the subsequent cultivations of the root crop by deep working implements break it up.

Normally this "pan" formation is most serious on farms where the growing of grain crops in the same field for several years is practised. A subsoiling tine attached to the beam of the plough may be used to assist in the breaking of the "pan". This has the added advantage

that the hard layer is merely broken and not brought to the surface.

Care and Maintenance of the Plough

The plough should be examined carefully each morning to see that all nuts and bolts are properly tightened. A plough at work, especially on stony soils, is in a constant state of vibration, and bolts and nuts tend to loosen. The grease gun should be used liberally on all nipples fitted to the plough. At the end of each day's work all shining parts should be given a light coat of grease or sump oil to prevent rusting. Only a few minutes with an old brush are required to do the job and it is time well spent. Rusty mouldboards, shares and disc coulters increase the draught considerably, and their useful length of life is shortened if rust is allowed to work freely.

Care should be exercised when turning at the headlands. Too sharp turning, which puts an excessive strain on the wheels and axles of the plough, should be avoided.

Pure Bred or First Cross Poultry?

One would have thought that there was nobody to-day who did not realise the fact that pure bred stock of any kind—be it cattle, pigs or poultry—is the basis of improvement and that such stock is a fundamental necessity if progress is to be achieved. But apparently there are still some poultry keepers who have not yet appreciated this fact.

No one can deny that great progress has been made by poultry keepers in this country during the past 30 years or so in raising the standard of quality and the egg production capabilities of their birds. What was the basis of this improvement? A large part of it is attributable to the influence of the poultry stations which were established by County Committees of Agriculture throughout the different counties. At these stations, only pure bred poultry could be kept and to guard against the risk of birds of two breeds inadvertently mating with one another and thus

producing first cross offspring, only one breed was permitted on a station.

That the stations have achieved the object for which they were established, namely, the improvement of farm poultry through the medium of hatching eggs from pure bred stock distributed from them, is freely acknowledged by everybody who has seen the results. It is safe to say that the stations have been largely instrumental in bringing about the marked change from mongrel poultry to pure bred stock which has taken place during this century.

The breeding of first crosses is a comparatively recent innovation. It was permitted, as a concession, when the scheme for the accreditation of poultry farms was inaugurated and it is still allowed on such farms but not during the early part of the hatching season. The development of hatcheries and of the day-old chick trade has given it further impetus and it was becoming apparent that, unless some

steps were taken to arrest its growth, it might become a menace to the industry by undermining the pure bred stocks of the country. The chief reason why first crosses were threatening to oust pure bred was the fact that one-year-old pullets could be mated in first cross pens on Accredited Farms whereas only birds which had completed at least a year's laying could be used in pure bred pens. This meant that all suitable eggs from the pullets could be sold for hatching at enhanced prices, as compared with the prices for table eggs, when cross bred mating was practised, and it is feared that the attractive prices paid by hatcheries for such eggs encouraged the practice. It also meant that an undue proportion of the total number of chicks hatched were of first crosses as the pullets laid more eggs than the older birds early in the season and many purchasers of day-old chicks thus got their full requirements in the form of first crosses.

This undesirable development was aggravated and still further encouraged by the fact that hatcheries continued to hatch throughout the summer, thereby encouraging poultry keepers who supplied them with eggs to maintain production until the autumn instead of force moulting their birds so as to prepare them for the resumption of laying from September onwards. Accordingly there were comparatively few eggs from the older birds early in the succeeding hatching season.

It is to encourage the rearing of a higher proportion of pure bred chicks early in the season, so as to intensify improvement through the medium of pure bred stock, that the mating of pens for first crosses is prohibited during the early part of the hatching season. For the same reason, it is a condition of the Accredited Hatcheries Scheme that hatching in 1946 shall cease on 15th June and not recommence until 1st September. The cessation of hatching in mid-June will encourage poultry keepers to break up the breeding pens at the end of May and get the birds force moulted in July so that they will be back in lay in autumn and thus enable eggs from pure bred matings to be available at the beginning of the new

season. Besides, summer hatched chickens are never profitable and invariably do more harm than good on the farm.

The policy of the Ministry is a straightforward one. It is designed to help the poultry keeping industry generally—not to put a few extra shillings in the pockets of a few at the expense of the many. Both the Accredited Farm Scheme and the Accredited Hatcheries Scheme are an effort to help the industry as a whole. Besides free blood testing, official approval and free advertisement are accorded to the farms which are included in the Register, but it cannot be expected that such would be done without imposing conditions which are considered to be necessary to make the scheme of the fullest benefit to the industry generally.

It must be remembered that first crosses cannot be obtained unless there are pure bred to make the matings; and that only pure bred stock is permitted on an Accredited Farm. The unrestricted distribution of first cross chicks would hinder the rapid increase in the number of Accredited Farms that is desirable, because farms on which there are first cross birds cannot be approved for registration.

There is no authentic evidence that first crosses are better layers than pure bred. It is popularly believed that the chicks are more easily reared, but this is open to doubt if the pure bred are from healthy mature stock. It is now well known that the crossing of strains of the same breed which have dissimilar characters in their constitution leads to deterioration in laying ability and if this is so in the case of strains within a breed it will be far more likely to occur when birds of two breeds are mated. This, therefore, suggests that first crosses are a first class gamble.

Apart from this consideration, however, there is the broad principle to keep in mind, namely, that the poultry of the country will rapidly deteriorate to mongrels if pure bred stock is replaced by crosses because breeding from first crosses is likely to take place on many of the farms to which these birds are distributed.

Opinions have been expressed that until an official breeding station is established there is not much advantage to be gained from pure bred poultry. This is a remarkable viewpoint which is not likely to be shared by breeders generally. It rather suggests that breeders are incapable of doing their own work and that, to be successful, the breeding must be done by somebody else. The laying tests show that there are breeders in Northern Ireland who have little to learn regarding the breeding of first class stock and first class layers and who may well feel proud of their ability and success in that sphere. For example, the White Leghorn breed has been brought back from the verge of extinction to a position of excellence in the space of about six years, as can be seen by inspecting the birds which were accepted for the current laying test at Stormont.

The absence of a breeding station is no justification for not attempting to improve poultry stocks through pure bred breeding. Such a station can never replace entirely the breeding of pure bred stock on farms. Its chief purpose and usefulness would be to augment the work being done by private breeders on their own farms and to help them by making available pedigree stock birds for mating with their own flocks.

Finally, there is the very important trade in pure bred stock with other countries to remember. What could be more advantageous to this country than to have the reputation not only of producing and sending to Great Britain eggs which are of top quality but also pure bred stock of a standard and quality that is second to none? To be able to participate in this trade means that pure bred stock and not first crosses must be available.

Food for Next Year.

There is still a dire necessity to produce all the food possible for both man and beast. The reduction in the tillage quota for 1946 is not to be regarded as an indication that the times of scarcity are past and that an era of plenty is at hand. Rather should it be interpreted to mean that a little more latitude in regard to the kinds of food our farmers may produce is being allowed.

Of the foods for direct human consumption which can be produced successfully in this country the most important are potatoes, wheat, oats and green vegetables, and every effort must still be made to maintain the production of these on the farms of this country. But also of urgent requirement are increased supplies of beef, mutton, bacon and eggs. No farmer need fear over production of any of these in the years immediately ahead; rather should he assume that there will be a ready demand and a sure market for all of them that he can offer for sale. In addition, milk will remain a priority food for which there will always be a ready sale.

Northern Ireland farmers have always specialised in the production of live stock and live stock products, and the

call for an increase in the production of these in the future should be welcomed by our farmers, as it means that they are being encouraged to develop the lines of production in which, by tradition, they are specialists.

But to produce live stock and live stock products freely, food in plenty is required, and so long as the rationing of animal feeding stuffs continues to operate, the necessity to grow food for livestock will exist. For example, a plentiful supply of oats is essential if poultry and egg production are to be extended, or even maintained at the existing level. Similarly, oats, kale, cabbage and silage are necessary to extend beef and milk production, and to conserve supplies of purchased foods for pig feeding and pork production, as the usual foods produced in this country are less suitable for pigs than for cattle.

It is not difficult, therefore, to see that tillage is necessary to support an increased production of stock and stock products, and that the success of the latter policy, will, in the meantime, be governed by the volume of home produced stock foods which stock owners grow on their own farms.

Seasonal Notes.

THE LAND.

Plough Early and Plough Well

In the article on page 203, which deals specifically with tractor ploughing, emphasis is laid on the importance of ploughing early and of doing the work well. These considerations apply with equal force to ploughing with horses.

Despite the fact that there are now so many tractor ploughs in Northern Ireland, it would be a mistake to depend solely on them to do the work in time and, therefore, ploughing with horses should continue to operate. Where facilities are available to have ploughing done by horses it should be the policy to use them, instead of waiting for ploughing contractors to do the job.

Every horse plough as well as every tractor plough should be kept going from now on, when soil conditions are suitable for the work.

No farmer should hesitate to push ahead with the ploughing because he thinks it is too early to plough. Early ploughing has many advantages and experience has shown that the best crops are obtained from land which has been ploughed early in the season.

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Making the Best Use of Farmyard Manure

Careful thought should be given to the utilisation of farmyard manure on farms where the supplies may not be adequate to meet all requirements to the full. Consequent on the increased area of land under the plough more farmyard manure than the normal quantity formerly required, is now needed for manuring potatoes and root crops, and it could not be put to better use than for this purpose.

Every endeavour must be made to maintain the fertility of the land that is under tillage crops, so as to have it in good heart by the time it is again laid down to grass after a crop rotation. To this end, one crop in the rotation should, if possible, be dressed with farmyard manure.

The crop that will give the best return for this dressing is potatoes,

and sufficient manure should be reserved to provide an application of about 15 tons per acre to all the land intended for potatoes. If, however, there will not be sufficient to permit of a dressing at that rate being applied to all the land for potatoes it is better to give a lighter dressing all round than a full dressing to some of the land and none at all to the remainder, provided, however, that if an area of early potatoes is to be grown that area receives the full dressing. Other things being equal, early potatoes require more liberal manuring than the main crop.

If supplies of farmyard manure are available now it is strongly recommended that the manure be spread over the stubble land intended for potatoes and ploughed down. This will save a great deal of time in spring and enable the planting of the crop to be completed with the minimum of delay at that season, when every hour is valuable.

Mangels, cabbage and kales also require a full dressing of farmyard manure; in addition to artificial manures, to produce full crops. These are gross feeders and will make good use of a heavier dressing than is customary for potatoes—from 20 to 25 tons per acre is a normal quantity to apply to these crops.

In the event of supplies of manure being insufficient to do more than to provide suitable dressings for the potatoes, mangels, cabbage and kale, no farmyard manure need be reserved for the turnip crop. That crop may be grown successfully on a suitable mixture of artificial manures, unless the land is in poor heart when, if at all possible, a light dressing should be given, both to help the turnip crop and to enrich the soil for the subsequent crops and pasture.

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Select or Order Seed Potatoes Now

It is a wise policy to ensure, early in the season, that an ample supply of

good seed potatoes will be available for planting in spring. When the season for planting comes is not the time to see if sufficient good seed is available. Too often a farmer runs short of good seed at planting time and goes to a neighbour's farm where he may get seed from an unhealthy crop. Such seed will not give full yields.

Farmers who specialise in growing crops of potatoes of a high standard of health and purity, such as those eligible for a Stock Seed Certificate, will, in most cases, be planting their own seed. They should select the seed as soon as possible and make sure that they will have enough for their own needs.

There are still many farmers, however, who continue to grow impure, unhealthy crops of potatoes with the result that, although the expense and trouble in growing the crops are the same as in the case of healthy crops, the yield obtained is not nearly so good. Those farmers are strongly advised to purchase seed from pure, healthy crops for planting next spring. Because a farmer does not intend to cater for the seed potato trade is no reason why he should not plant certified seed and have the highest possible yield.

If it is not practicable to plant the whole area of potatoes with seed from a healthy crop, at least a part of the area should be planted with such seed. This part, provided it is sufficiently isolated from unhealthy crops, will then provide sufficient healthy seed to plant the whole area in the following year.

In order to ensure getting good seed from crops of a high standard of health and purity, growers should purchase seed which has been certified by the Ministry. Lists of the names and addresses of growers of certified seed can be obtained from the Ministry, free on request.

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Plan to Sprout Seed Potatoes

It has long since been proved that maximum potato yields can only be obtained from tubers that are properly sprouted. Tests have shown that well sprouted seed will give at least $1\frac{1}{2}$ tons per acre more than unsprouted seed

grown under similar conditions. There are still far too many farmers who do not make use of this knowledge and who allow their potatoes intended for seed to remain in clamps until late winter or early spring, instead of setting them up to sprout.

When the potatoes are taken indoors at this late season the spindly, worthless sprouts which they have produced have, of course, to be removed and it is then much too late to hope for good, strong, vigorous sprouts to be produced before planting time, even though the tubers are then set up under ideal conditions to sprout. The aim in all cases should be to have the tubers intended for seed set up to sprout before Christmas. Only by doing this will it be possible to ensure that the first sprouts that appear on the tubers can be retained. In this connection it should be noted that the first sprouts are the most vigorous, and every care should be taken to ensure that these are retained.

The seed potatoes should be set up to sprout in shallow layers, preferably not more than one or two tubers deep. Sprouting boxes, wooden trays or dry floors are all equally suitable for this purpose. The main essential is that the building in which the seed is stored should be well lighted and that the sprouting boxes or trays, if such are used, should be so arranged that all the tubers get direct light.

Another very important point is that plans should be made to protect seed from frost if the house in which they are stored is not frost proof. Some of the methods which may be adopted were outlined on page 175 of the October issue of this Report.

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Maintain Drains in Good Order

During the past few years many farmers have taken advantage of the Ministry's Land Improvement Scheme to drain their land. In some cases open drains have been made, in others existing drains have been reopened and renewed, while in others new closed drains have been made. In all these cases it is in the farmer's own interest to keep the drains in good

order. The full benefit will not be obtained from the Ministry's grant if the drains are allowed to fall into bad repair.

In the case of closed drains the outlets should be inspected frequently and cleared of any obstruction which may be blocking them. If the outlets were left blocked up, even for a short time, the stoppage would have a very harmful effect on the whole system, as the stopping of the flow of water would tend to cause the drains to become silted up.

Open drains frequently become blocked at intervals as a result of cattle crossing them or treading down the bank when drinking from them.

If a drain is blocked, even at only one place, the flow of water is stopped, the usefulness of the whole system is lessened, and it will become choked with weeds, etc., very quickly. If, however, these drains are inspected periodically, the clearing of any places which are blocked up will not require much time, and the full usefulness of the drains will be maintained.

Farmers should remember that once a grant has been obtained from the Ministry for the making or reopening of drains, another grant at a future date cannot be given for the cleaning or repair of those drains. Such work is only maintenance and it is in the farmer's own interests to maintain his drains in good order.

THE LIVESTOCK.

More Milk from Winter Calvers

Inadequate feeding of in-calf cows in winter leads to a considerable loss of milk in this country. To get a full return from the dairy cow she must receive adequate feeding, in the form of fodder, green food and concentrates before she calves, so that she will be in good condition, with her body reserves well built up, and thus be able to stand up to the strain of the ensuing lactation. Good feeding after calving is not sufficient to enable her to give of her best.

It seems to be the opinion of some farmers that the feeding of concentrates to in-calf cows would be liable to result in udder troubles, milk fever, etc., after calving. This opinion is wrong. The feeding of concentrates will not cause such troubles, provided that the quantity fed is regulated according to the requirements of the individual cows and that none is fed during the last few days before calving.

If, when considering the feeding of in-calf cows in winter, a little thought is given to the summer feeding of such cows, any doubt as to whether or not concentrates should be given will cease to exist. What farmer is there who would not graze his in-calf cows on the best grass available in summer? Yet good young grass is a highly con-

centrated foodstuff and more productive than any foods that are available in winter. Admittedly a dry cow will consume less grass than one that is in high production but she will eat sufficient to maintain herself in good condition. No one doubts that it pays well to have cows calving in good condition in summer. Why not, therefore, aim at having them in equally good condition at calving time in winter?

The special feeding prior to calving in winter should begin about four or five weeks before the cow is due to calve, and should be in addition to the usual daily rations of hay and from 20 to 30 lb. of silage, kale or roots, which she should be receiving up to that time. The extra feeding should consist of about 2 lb. per day of the normal balanced dairy ration, increased gradually to about 5 or 6 lb. per day. The quantity of concentrates to be fed to individual cows, however, should always be determined by the condition of the animals as it is wasteful to overfeed those in high condition, while full returns will not be obtained from those which calve in poor condition.

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Management of the Dairy Herd

In an article in the October issue of this Report the winter feeding of dairy cows was dealt with in detail. Even

though full use is made of home-grown foods and a strict system of feeding according to yield adopted, the cost of feeding will still form by far the largest part of the expense of winter milk production.

But good management is also important. It will enable the cows to make full use of the food and thus lead to economies in feeding and to the highest possible production being obtained. It is obvious, therefore, that the dairy herd must be properly managed to ensure a full return from the food consumed and the highest financial gain from the undertaking.

The dairy cow must be comfortably housed in a well-ventilated, draught-free byre. In this connection it should be noted that it is a mistake to keep the byre too warm in winter. The atmosphere inside the byre should never feel warm and stuffy. On the other hand, freshness and coolness should not be sought by creating draughts. If a cow is standing in a draughty byre not only will her milk yield diminish but her health may be undermined.

The cow is, to some extent, an excitable animal. Especially is this so in the case of the dairy breeds. It is important, therefore, that the person attending the cows should be interested in his job and understand the proper management and handling of them. Cows should always be treated gently and not annoyed by the presence of dogs, etc., in the byre at milking time, otherwise they may "hold up" part of their milk.

Efficient milking is another important point in the management of cows. It is a recognised fact that failure to remove all the milk at each milking leads to a progressive lowering of the yield, as well as to a reduction in the quality of the milk, since the last milk drawn is the richest in butter fat. In fact, the leaving of some milk in the udder is a commonly used method of drying off a cow. Slow, inefficient milking has the same effect. The aim when milking a cow should always be to get the job done as quietly, quickly and efficiently as possible.

Dairy cows should be groomed regularly with currycomb and brush. Besides being a valuable aid in the production of clean milk, this encourages the maintenance of health by helping the blood circulatory system to function efficiently. It also helps to keep the coat in good condition and reduces the risk of an infestation of lice.

Should lice appear, in spite of precautions, these must be dealt with immediately as a cow cannot give of her best if she is constantly being irritated. The pests may be destroyed by dressing the animals' backs with a 5 per cent. solution of Jeyes' Fluid (1 part in 20 parts water). The dressing should be made up using slightly heated water to avoid the possibility of chilling the animals. The dressing should be repeated in about 10 days' time to kill any lice which may have hatched in the meantime from eggs present at the time of the first dressing as the dressing does not kill the eggs.

No class of farm livestock requires and deserves such careful attention as dairy cows. The attendants should be persons who have an interest in their work and who are prepared to do it well. The extra return from cows that are given this individual attention will pay well for any extra expense involved in the employment of really efficient workers.

* * * *

Good Calf Houses Necessary

The health and vigour of any mature animal is very largely determined by the care the animal received during the first few months of its life. The importance of proper feeding is generally appreciated, but all too often the housing of young stock is of a low standard. This is particularly so in the case of young calves which, on many farms, are crowded together in some draughty, dirty, dark corner. Every calf that is being reared is worth rearing well, but that cannot be done if good housing is not provided.

The essentials of a good calf house are that it should be well lighted, warm, well ventilated and easily kept clean. On many farms existing buildings could be converted into good calf

houses at little cost. Calves, in common with other young stock, seldom do well without light and adequate windows should be provided, preferably high up in the walls, or in the roof, and facing the south or south-west.

Young calves should be kept warm but adequate ventilation must be provided, as a stuffy atmosphere is not conducive to good health. The floor and walls of the calf house should be of smoothly finished cement concrete so as to facilitate cleaning. The house should be cleaned out regularly and kept well bedded with clean straw always.

If it can be arranged individual pens are best for young calves. This prevents the common calfhood vices of "sucking" and hair eating. Six feet square is a suitable size for pens and the side walls need not be more than about 4 inches thick and 4 feet high. It is very convenient if the pens can be placed in one or two rows with the doors opening to a single feeding passage.

A pen should always be thoroughly washed out and disinfected for the newly born calf before a cow is due to calve. This will lessen the risk of serious infectious diseases such as White Scour.

* * * *

Pig Production Prospects

Many farmers will now be thinking of resuming pig-keeping or of increasing the number of pigs on their farms, consequent on the increased rations for pigs and on the arrangement whereby rations may be obtained for any additional pigs brought on to the farm since the agricultural census was taken last June. Formerly the rations allowed for pigs were based on the number on the farm at 1st June. In addition to giving rations for these

extra pigs, the quantity allowed has been increased, and for the present rationing period it is 6 lb. per day for sows and 4 lb. per day for other pigs over 2 months old. These allowances should be adequate in normal circumstances to enable pig keepers to complete the fattening of their pigs.

The prices ruling for suckers suggest that pig feeders are competing keenly for supplies and that the demand is increasing. This, in turn, suggests that the breeding of pigs should be increased.

An increase in pig breeding at the quickest possible rate is to be commended but it would be fatal to the industry if the increase were made at the expense of quality. It is, therefore, most important that every care should be taken when selecting stock for breeding. This applies equally to both females and males. The County Committees of Agriculture have made provision for an increased number of boar premiums in 1946 but these can only be filled if pedigree breeders produce the right class of pig in sufficient numbers.

The type of gilts or sows with which the premium boars are mated must also be given attention if the standard of quality in the pigs of the country is to be satisfactory. It would be a grave mistake to try and meet the apparent rapid increase in demand for pigs by mating poor quality gilts or sows. This might meet the immediate requirements but it would be bound to have an adverse effect in the long run as it would lower the standard of quality all round.

The policy should be to endeavour to raise the standard of quality by using only breeding stock of the best possible quality.

THE POULTRY.]

Running the Incubator

The machine should be set level. It is advisable to use a spirit level to make sure of this as levelness is essential to the maintenance of a uniform temperature throughout the machine. Also, the incubator should never be

placed against a wall as this would prevent free circulation of air around it. A constant supply of fresh air is essential to the well being of the developing chicks.

It is important that the incubator room should not feel stuffy at any time.

The room should be properly ventilated with, if possible, air inlets at or near floor level and an outlet in the roof. This means that there will be an upward circulation of air and in order that the eggs will get full advantage of this air circulation the incubator, if not provided with legs, should be placed on a slatted floor platform raised above the level of the air inlets. It is important, however, that the air circulation will not be such as will cause a draught.

It is advisable to run the incubator at a temperature of 101 degrees, Fahrenheit, for about a day, before putting in the eggs to ensure that the temperature is being maintained at a steady level. After the eggs are put in the door of the machine should be left open for a short time so as to prevent the eggs from experiencing a too sudden rise in temperature. Otherwise they may be heated too rapidly which might cause the yolks to break and leave them useless for hatching. Thereafter the temperature should be maintained at 102 to 103 degrees.

The eggs should be turned morning and evening from the second until the nineteenth day of the hatch. The door of the incubator should be kept closed while the egg tray is out for the eggs to be turned, except during the last week of the hatching period. Then the door should be left open while the eggs are being turned, provided the temperature of the room does not fall below 55 degrees, Fahrenheit. Leaving the door open ensures that the air in the incubator is completely changed.

On the ninth and fifteenth days the eggs should be tested and at each testing any which are infertile or addled should be removed.

In hot air machines one felt should be removed after the first testing and the second after the second testing. This is necessary to ensure that a sufficient supply of fresh air enters the machine during the later stages of the hatch. Fresh air is essential to the welfare of the developing chicks, especially during the last week before hatching.

The moisture trays should be kept filled throughout the period of the hatch, care being taken that any fresh water added is at a temperature of about 103 degrees, Fahrenheit.

After the nineteenth day the machine should not be opened until the hatch is complete, as at this stage cold air rushing in would be likely to spoil the hatch. On the twenty-first day, the hatch should be regarded as complete, as chicks hatched after that are unlikely to be worth trying to rear. The chicks should not be transferred to the brooder until they are dry and active.

Fuller information on the running of an incubator is given in leaflet No. 20.

* * * *

Common Mistakes in Chick Rearing

Most brooders on the market are stated to hold a certain number of chicks, but it should be remembered that this figure applies only when the chicks are under, say, a fortnight old. Bearing this in mind, it is advisable, when hatching chicks which cannot readily be sexed, to provide, for example, a 200-chick size brooder for a normal hatch from a 150-egg incubator.

Overcrowding is the most common cause of unthriftiness in chickens.

The newly hatched chick has a reserve of undigested food in its body, in the form of the absorbed yolk, that is sufficient to meet its requirements for from one to two days. Even after this the feeding should be light until the fifth or sixth day. Much digestive trouble is brought about by over-feeding young chicks. Small feeds at frequent intervals should be the rule during the first week or so.

It is important to ensure that the chicks are never thirsty: clean water or diluted milk should be offered from the first.

The brooder house should be thoroughly cleaned out every day, and dry, finely-chopped straw or clean chaff provided as litter. This in itself is a valuable aid in preventing an attack of coccidiosis.

Care should be taken to ensure that all feeding and drinking utensils are kept scrupulously clean and scalded regularly. Any food which may be spilled on the floor should be removed with the droppings.

Chicks require a considerable quantity of drinking water or milk. The small water fountains in common use are quite suitable but too often not enough of these are provided, or those in use are not kept filled. It should be remembered that lack of drink may bring about serious digestive trouble and keep the chickens from doing well, especially if dry mash is being fed.

It is very desirable that chicks reared indoors should be supplied with green food. Cabbage, kale, turnip tops, or even dandelion leaves or nettles are suitable forms of green food for chicks. These supply minerals and vitamins which are essential to good health and growth. Even when the chickens are allowed out, it is necessary to provide green food in winter as very little nourishment is obtained from the pasture during that time.

The green food may be fed in the raw state, either alone or chopped up and included in the mash. When being fed alone, except in the case of very young chickens, the green leaves should be suspended in the house so that the birds have to stretch up to reach them. This provides exercise for the birds and also helps to keep the house clean.

* * * *

Scratching Sheds

Quite a number of points need careful attention if maximum egg production during the winter months is to be obtained. Most of these are obvious, but some do not always receive attention. There is one point, however, which is of the utmost importance and which is often overlooked by the poultry-keeper; it is that the laying hen must have comfort if she is to give of her best. The first step in this direction is to provide a clean, well-ventilated draught-free house.

The weather during many days of winter is either too cold or too wet for poultry to stay outside with comfort, and if scratching room is provided they

will do much better if kept indoors in such weather. The ordinary solid-floor poultry house is quite suitable as a scratching shed if a droppings board is fitted and the floor is kept well littered.

If, however, the birds are housed in slatted-floor houses, a scratching shed is an advantage. The type of shed is not very important so long as it is large enough to accommodate the flock. However, it should be weather-proof so that the floor will remain dry. It should be placed convenient to the houses and the birds encouraged to go into it by feeding them in it.

It is important that the shed should be kept well littered with dry straw, and the litter renewed periodically. In this connection it is better to clean out and disinfect the shed thoroughly rather than to add more litter to that already in the shed.

During inclement weather the grain allowance should be scattered in the litter of the scratching shed. Searching for the grain will keep the birds active during most of the time, and this increased activity and comfort will, if proper attention is paid to feeding and general management, result in improved health and an enhanced output of eggs.

* * * *

Selecting Breeding Turkeys

The selection of turkeys for breeding, both cocks and hens, should be made before the flock is fattened for the christmas market. The fattening process may have a serious adverse effect on the subsequent value of the birds as breeders, and many of the disappointments met in that respect are traceable to the effects of intensive feeding during November and December. To ensure that a turkey cock shall be active and fertile during the next breeding season, he should be allowed full liberty and kept only in good store condition.

The practice of purchasing turkey roosters by weight has had the effect, in some cases at least, of encouraging the owners to fatten the birds so that they will command the highest possible price. This may be to the advantage

of the seller for that particular year, but in the long run, it is to the disadvantage of seller as well as buyer as repeat orders may be lost. A much better system would be to buy the birds at a flat rate per head, selecting

only those that are in good store condition and paying a price that would be approximately the same as that when fattened birds are bought by weight. This would be to the advantage of the seller also, as food would be saved.

THE ORCHARD AND GARDEN.

Planting Fruit Trees

It may be that when young bushes or trees arrive from the nursery the ground is not in a suitable condition for planting them immediately. In such circumstances it is advisable to "heel in" the plants in a sheltered corner. A hole should be dug sufficiently deep to accommodate the roots of the plant, and after the packing has been removed the roots should be placed in the hole and covered with soil. This covering of soil will protect the roots against exposure to drying air and the plants will be safe until the ground is suitable for planting them.

When planting apple, pear and plum trees care should be taken to see that the trees are planted at the correct depth. Too deep planting may encourage "scion rooting" which is detrimental to the production of good crops of fruit, and too shallow planting may result in losses from shaking in the wind, unless the plants have been well staked. Also, the roots of trees planted too near the surface are at the mercy of the elements and, in periods of drought or during a dry spring, often suffer from water shortage. This results in the trees being slow to develop.

A good guide as to the correct depth at which to plant is the nursery soil mark on the stem of the tree. The tree should be set out at the same depth as that at which it was growing in the nursery.

In large plantations it is particularly important to stake the trees securely when planting. A stout stake, at least $1\frac{1}{2}$ inches square and about 4 feet long, should be driven into the ground in the centre of the hole where the tree is to be planted. When the tree has been settled in the hole and the soil made firm, the stem of the tree should be tied temporarily to the stake so that it

cannot move in any direction. A strip of hessian should be placed around the tree stem underneath the tie to protect the stem from injury against the stake. As the soil settles the tie should be undone and renewed.

* * * *

Planting Soft Fruit

Many farmers and gardeners may have in view the planting of an increased acreage of soft fruit in the coming seasons and, accordingly, some information regarding the cost of purchasing plants, etc., may be of interest.

The distance advised for planting 2-year old blackcurrant bushes is $5\frac{1}{2}$ feet apart, in rows which are approximately $7\frac{1}{2}$ feet apart. At this spacing about 1,550 plants, at an approximate cost of from £40 to £50, would be required for one acre of land. The yield of blackcurrants in the second year after planting should be anything up to $1\frac{1}{2}$ tons per acre.

The planting distance for raspberry canes should be 2 feet between the plants and 5 feet between the rows. This requires around 8,700 canes per acre at a cost of about £80. The total yield from the plantation in the second season after planting should be from $1\frac{1}{2}$ to 2 tons of fruit per acre.

Strawberry runners should be planted at $1\frac{1}{2}$ feet apart in rows 3 feet apart. At this spacing 10,000 plants would be required for one acre and the cost of them would vary from £40 to £50. The yield to be expected from one acre of strawberries in the second year after planting would be from 2 to $2\frac{1}{2}$ tons.

* * * *

Overhaul Spraying Machinery

As the fruit tree spraying season is approaching quickly it would be wise to spend a wet afternoon checking over

the spraying equipment. Delays during spraying caused by breakdowns can often be prevented by an overhaul of the equipment beforehand. The points to which particular attention should be paid are :

- (1) Engine. Clean the plugs and re-set the points. Drain the oil sump and refill with fresh oil. See that the air intake "butterfly" valve of the carburettor is working freely. Clean the points of the distributor. Free the petrol filter of dirt and water.
- (2) Pump. As most types of pumps are totally enclosed it is not advisable to dismantle them on the farm. If there is any doubt regarding the efficiency of the pump it is best to have it seen to by an experienced mechanic.
- (3) Hoses and Nozzles. The hoses should be inspected for cuts and weak parts, and any defects made good. The nozzles of guns and lances should be unscrewed, and cleaned out with cold water. Worn discs should be replaced by new ones.

Finally, the outfit should be started up and some cold water put through the hoses at the pressure usually employed when spraying. It is better to discover weak points in the hoses, etc. in time so that spraying will not be held up while repairs are being effected or replacement made, when spraying time arrives. Spraying time is precious, as it is short and the weather not always favourable, so fruit growers must be prepared to take full advantage of every suitable hour when the season is here.

Furthermore, if supplies of spraying materials have not yet been obtained they should be purchased at once so that they will be at hand when required.

* * * *

In the Vegetable Garden

The month of November sees a general cessation of growth of plant life and work in the vegetable garden is of a general "clearing up" nature, together with preparations for another season's cropping.

The most important of all jobs at this time of the year is the digging and trenching of ground intended for next year's vegetable crops. This work should be pushed ahead at every opportunity, while the soil is in a workable state.

Dead and decaying leaves should be removed from plants of Brussels sprouts to allow the maximum light and air to reach the young developing sprouts. Weeds between the rows of all crops still in the ground should be removed, as even annual weeds, such as groundsel, can seed themselves in winter time.

* * * *

Rhubarb

Should rhubarb need dividing, the old crowns may be lifted now and divided with a spade, so that each piece has only one crown bud. The outside "sets" of the crown usually have more vigour than the centre ones, and so the inside portion should be discarded.

The ground in which the "sets" are to be planted should be made free of the roots of perennial weeds and be heavily manured with farmyard manure. No stalks should be pulled the first year after planting so as to allow the plants to build up a good vigorous root system for the following year.

To obtain a supply of "forced" rhubarb from next January to March some crowns should now be packed into boxes of leaf mould or light soil and placed in a warm, dark place, such as under the staging of the greenhouse. If the place is kept darkened the young stalks will be of better quality. Outdoors, some crowns can be forced where they are growing by placing boxes over the crowns and heaping horse manure or leaves around the boxes to keep out the cold and to furnish a little heat.

* * * *

Glasshouses

Where glasshouses have not yet been planted with lettuce this work can still be undertaken. Before planting the lettuce the glass and woodwork should be thoroughly washed down with soapy water to which a good disinfectant has been added. If spray-

ing apparatus is available it would be more satisfactory to spray on the disinfectant, as by this means the solution is forced into all the cracks and crevices in the woodwork which cannot be reached when it is applied by hand.

Cresylic acid is a suitable disinfectant material for the purpose. It should be used at a dilution of 2 per cent., that is, 1 gallon of the acid in 49 gallons of water.

The soil should be sterilised by applying a solution of 1 gallon of formaldehyde in 49 gallons of water to the surface of from 10 to 18 square yards of soil. After applying the formaldehyde solution the house should be allowed to lie idle for from 3 to 4 weeks before putting in the lettuce plants.

In the case of small glasshouses it may be more satisfactory to change the soil. If this is being done the soil should be removed to a depth of at least 18 inches and replaced with fresh soil taken from a stubble field following lea.

If the houses are heated, lettuce seed sown during early October will have given plants fit to plant out during December and January. Varieties such as Cheshunt Early Giant and Golden Ball are suitable. In unheated houses the plants may be set out now but the crop will be later in coming to maturity. May Queen, Cheshunt Early Ball and Loos Tennis Ball are suitable varieties of lettuce for cold houses.

Agricultural Prices.

GROWERS' PRICES PER CWT. OF 1945 CEREAL CROPS.

December					s.	d.	
Wheat (Millable)	...	...	...	...	13	10	(Fixed)
" (Non-millable)	...	...	...	...	11	0	(Maximum)
Oats (Milling)	...	...	...	...	15	1	(Maximum)
" "	...	...	...	...	14	2	(Minimum)
" (Feeding)	...	...	...	...	14	10	(Maximum)
Barley (For human consumption)	...	...	...	...	25	0	(Maximum)
" (Millable)	...	...	...	...	22	6	(Minimum)
" (Feeding)	...	...	...	...	14	6	(Maximum)
Dredge Corn Millable—Barley)	...	...	...	...	25	0	(Maximum)
" "	...	...	...	...	17	6	(Minimum)
" " (Millable—Other)	...	...	...	...	13	10	(Maximum)
" "	...	...	...	...	13	0	(Minimum)
" " (Non-millable—Mixed Pulses)	...	...	...	...	22	0	(Maximum)
" " (Non-millable—Other)	...	...	...	...	13	6	(Maximum)
Rye (Millable)	...	...	...	...	13	0	(Fixed)
" (Non-Millable)	...	...	...	...	13	0	(Maximum)
Beans	...	...	...	...	22	0	(Maximum)
Feeding Peas	...	...	...	...	35	0	(Maximum)

FIXED PRICES OF FAT STOCK.

(Livestock and Meat Control Scheme).

Steers and Heifers (Home-bred).

Period	Grade and Killing-out Percentage.									
	†Super Special 59 & over	* Special 58	A + 57	A 56	A — 55	B + 54	B 53	B — 52	C + 51	C 50
1945										
19th Nov. to 25th Nov.	77/6	76/-	74/6	73/-	71/6	70/-	68/-	65/6	56/-	53/-
26th Nov. to 2nd Dec.	78/-	76/6	75/-	73/6	72/-	70/6	68/6	66/-	56/6	53/6
3rd Dec. to 9th Dec.	78/6	77/-	75/6	74/-	72/6	71/-	69/-	66/6	57/-	54/-
10th Dec. to 23rd Dec.	79/6	78/-	76/6	75/-	73/6	72/-	70/-	67/6	58/-	55/-

The prices of Home-bred cow heifers 54 per cent. and over will be 5/- per cwt. less, the 53 per cent. will be 7/6 per cwt. less, and 52 per cent, 51 per cent, and 50 per cent, will be 10/- per cwt. less than for home-bred steers and heifers of the corresponding grades.

†The Super-Special grade will apply only to steers and cow heifers weighing 9 to 13 cwt. net live weight and to heifers weighing 8 to 12 cwt. net live weight (i.e., gross live weight, less 28 lb.).

Animals of these classes estimated to kill out at 59 per cent. or over, but falling outside the weight limits quoted will be graded as special grade animals.

A Quality Premium of 2/6 per cwt. will be paid for home-bred steers, heifers and cow-heifers of 55 per cent. and over (i.e., Grade A— and Upwards). This premium will apply only to steers and cow-heifers weighing 9 to 13 cwt. net live weight and to heifers weighing 8 to 12 cwt. net live weight (i.e., gross live weight, less 28 lb.). Animals falling outside these weight limits will not be eligible for the quality premium, but prices will be so adjusted that any animals otherwise eligible but weighing more than the maximum qualifying weight will fetch not less than the price for an animal of corresponding grade of 13 cwt. or 12 cwt. as the case may be.

Imported cattle will not be eligible for the quality premium.

Cow heifers : The definition to be "Any female bovine animal which has calved but which has not grown more than seven permanent incisor teeth and still retains at least one temporary incisor tooth."

Cows (Home-bred and T.A.B.)†

Period	Grade and Killing-out Percentage.									
	*Special		A + 55 & over	A — 54	A — 53	B + 52	B 51	B — 50	C + 49	C 48
	55 & over	53 & under 55								
1945 3rd Dec. to 30th Dec.	60/-	57/6	49/-	47/-	45/-	43/-	41/-	39/-	36/-	32/-

Bulls (Home-bred and T.A.B.)†

Period	Grade and Killing-out Percentage.									
	*Special		A + 57 & over	A 56	A — 55	B + 54	B 53	B — 52	C + 51	C 50
	56 & over	54 & under 56								
1945 3rd Dec. to 30th Dec.	60/-	57/6	46/-	45/-	43/6	42/6	41/6	36/6	33/6	30/6

Bulls (Special) : The definition to be "Young Bulls which have grown no permanent incisor teeth."

*These grades must be well finished young stock yielding first quality beef. Steers, heifers, cow-heifers and bulls which kill out at less than 50 per cent. and fat cows which kill out at less than 48 per cent. of their live weight will be bought as rejects. The price to the producer for Reject cattle will be at the rate of 7d. per lb. for home-bred and imported cattle which have been in Northern Ireland for over 2 months, and at the rate of 3½d. per lb. for imported cattle which have been in Northern Ireland for less than 2 months, for so much of the dressed carcase weight as is fit for human consumption with an additional payment in respect of the hide.

Imported steers, heifers and cow-heifers which have completed two months in Northern Ireland will be paid for at 5/- per live cwt. less than the fixed prices payable for corresponding grades of home-bred cattle.

†T.A.B. indicates imported animals which have been in Northern Ireland for a period of two months or longer.

HOME-BRED SHEEP.

Prices per lb. estimated dressed carcase weight.

Period commencing	Lambs			Sheep	Light Weight Ewes	Heavy Weight Ewes	Rams	Unthrifty Lambs and Overfat Sheep	Unthrifty Sheep
	First grade	Second grade (Hill)	Ram Lambs						
1945	d.	d.	d.	d.	d.	d.	d.	d.	d.
19th Nov. to 25th Nov.	18½	15½	13½	17	11	9½	8½	9½	8½
26th Nov. to 2nd Dec.	18½	16	13½	17½	11	9½	8½	9½	8½
3rd Dec. to 9th Dec.	18½	16	14	17½	11½	9½	9	10	9
10th Dec. to 16th Dec.	19	16½	14	17½	11½	9½	9	10	9

Headage payments over and above the per lb. price will be paid for first quality sheep and lambs as follows :—

21 lb. and not over 25lb.	...	...	2s. 0d. per head.
Over 25 lb. " " 48 lb.	...	...	3s. 0d. "
" 48 lb. " " 60 lb.	...	...	2s. 0d. "

Lambs, sheep and ewes for manufacturing purposes will be paid for at 5d. per lb. estimated dressed carcase weight. Rams for manufacturing purposes will be paid for at 4d. per lb. estimated dressed carcase weight.

The foregoing prices are subject to alteration by the Ministry of Food, without notice.

REALISED PRICES OF LIVESTOCK AT FAIRS.

Average prices of Livestock at Fairs during the month of October, 1945.

Date	Fair	Calves (under 9 months)	Store Cattle	Springers		Milch Cows	Young Pigs (8-12 weeks old)
				Cows	Heifers		
		per head £ s.	per cwt. live weight	per head £ s.	per head £ s.	per head £ s.	per head £ s.
2	Omagh	7 0	60/- to 65/-	27 0	26 0	27 10	—
3	Londonderry	—	62/- to 63/-	23 0	—	—	—
3	Rathfriland	4 17/6	50/- to 60/-	28 10	24 0	27 10	—
4	Ballymoney	—	50/- to 65/-	—	—	—	4 10
4	Strabane	—	50/- to 59/-	—	—	—	—
5	Moy	6 5	56/- to 60/-	34 0	24 0	30 0	—
8	Irvinestown	5 0	48/6 to 66/-	25 0	21 10	—	4 2/6
8	Limavady	—	60/- to 63/-	26 0	—	—	—
9	Dungiven	—	60/- to 62/-	25 0	—	—	3 10
10	Crossgar	9 10	55/- to 65/-	—	—	—	—
10	Enniskillen	5 15	52/- to 59/-	28 0	22 0	27 0	4 15
10	Kilrea	6 0	42/- to 63/-	30 0	26 0	27 0	4 10
12	Ballygawley	—	62/6 to 70/-	25 0	—	23 0	3 15
15	Camlough	7 0	58/6 to 65/6	23 10	22 10	22 0	—
17	Lisnaskea	7 0	50/- to 65/-	27 0	27 0	25 0	4 10
18	Ballynahinch	9 10	57/6 to 65/-	36 0	32 0	43 0	4 15
20	Portadown	—	60/- to 62/-	33 0	28 0	31 0	—
22	Fintona	5 10	60/- to 63/-	30 0	29 0	30 0	4 15
22	Money more	—	58/- to 66/6	26 0	23 10	25 7/6	—
26	Castlederg	—	60/- to 63/-	36 0	28 0	—	4 10
26	Killylea	—	61/- to 70/-	33 0	—	27 0	—
27	Ballymena	7 15	48/6 to 67/-	34 0	30 0	27 10	3 0

TRADE IN LIVESTOCK AT FAIRS.

At a few centres last month there were large supplies of store cattle, but generally the offerings at fairs were only of small to medium dimensions. Early in the month an improved trade ruled at most centres and prices, where altered, moved in favour of sellers, but thereafter, transport difficulties made shippers cautious in their purchases and most of the business was done by local buyers. At this stage only large well-conditioned animals found a ready sale and whilst most of these maintained their previous values, lower rates had to be accepted for all other descriptions.

Supplies of dairy cattle showed little change, and for all animals showing promise of milk a keen enquiry was passing at further increased values. Only inferior types were neglected.

The numbers of sheep and lambs showed seasonal reductions, and a fair trade was transacted at prices similar to those obtaining a month ago. Good breeding ewes were in seasonal demand, but crossbred feeding lambs also found a fairly ready sale at most centres. Price ranges per head were as follows:—Crossbred lambs and breeding ewes, 30/- to 60/- and 40/- to 90/-, respectively; mountain lambs, wethers and breeding ewes, 20/- to 40/-, 25/- to 50/-, and 20/- to 72/6.

Small to medium offerings of young pigs were in keen request at further increased quotations ranging from 44/- to 110/- per head. For the very light supplies of store pigs trade was good at most centres, and prices firmed and ranged from 70/- to 140/- per head.

Notes of the Month.

The Tillage Order for 1946

The area which must be cultivated in 1946 on each farm has been reduced from 45% to 35% of the arable area. This quota applies to all of Northern Ireland save the County of Fermanagh and a special area in South Antrim which is defined below, where the quota has been reduced from 30% to 25%. First year hay does not count as being under the plough.

Farmers should bear in mind that it is an offence to allow land to return to grass without proper re-seeding and manuring.

The quota to be ploughed and cropped is one quarter (25%) of the arable land in the special area of South Antrim comprising the District Electoral Divisions of Ballynadrentagh, Ballyrobin, Carnall, Craigarogan, Crumlin, Dundesert, Seacash and Templepatrick, in the Rural District of Antrim, Ballyduff, Ballygomartin, Ballygolan, Ballysillan, Carnmoney, Jordanstown, Monkstown, Whiteabbey and Whitehouse in the Rural District of Belfast, Carncastle, Carrickfergus Rural, Carrickfergus Urban, Eden, Glynn, Islandmagee North, Islandmagee South, Middle Division, Templecorran, Whitehead Urban, in the Rural District of Larne, Aghalee, Ballinderry, Ballyscolly, Derryaghy, Dunmurry, Glenavy, Island Kelly, Lambeg, Lisnagarvey, Lissue, Magheragall, Magheramesk, Malone, Montiahs, and Tullyrusk in the Rural District of Lisburn and the Clifton, Cromac, Duncairn, Falls, St. Anne's, Shankill, Windsor and Woodvale Wards in the County Borough of Belfast.

An important feature of the Tillage Order, which applies throughout Northern Ireland, is that where land is being cropped with cereals or flax in the year 1946 and has also been cropped with cereals or flax only in each of the years 1943, 1944 and 1945, the occupier must sow such land down to grass before the 31st May, 1946. Such land must be dressed with phosphates.

In County Fermanagh, the portion of arable land to be cultivated in 1946 has been reduced to 25% (or one quarter). County Fermanagh farmers are required also—

- (1) to dress—before 31st December, 1945—an area of grassland equivalent to three-tenths of the arable area of their farms with 8 cwt. Basic Slag or 5 cwt. Ground Rock Phosphate or 5 cwt. Semsol per statute acre;
- (2) to apply a dressing of artificial manure to any land planted with potatoes. The prescribed dressing is 6 cwt. Special Potato Manure or a mixture of 1 cwt. Sulphate of Ammonia, 4 cwt. (British) Superphosphate (or 1½ cwt. American Superphosphate) and 1 cwt. Muriate of Potash per statute acre;
- (3) to sow a specified seeds mixture on and apply a dressing of 3 cwt. Superphosphate or 1 cwt. American Superphosphate or 5 cwt. Basic Slag, Semsol, or Ground Rock Phosphate per statute acre to all land being sown down to grass, whether or not that land has been cropped with potatoes or roots and dressed with farmyard manure. Particulars of the seeds mixture will be published later.

(The special seeds mixture and the dressing of phosphates must also be used in sowing land down to grass in the District Electoral Divisions of Aghafad, Dromore, Drumharvey, Ecclesville, Fallaghearn, Fintona, Greenan, Kilskeery, Lifford, Moorfield, Rahony, Tattymoyle and Trillick, all in the Rural District of Omagh, in the County of Tyrone.)

In areas other than Fermanagh and the part of Tyrone mentioned above, the Grass Seeds and Fertilisers Order requires that—

(1) no land must be allowed to tumble down to grass without sowing a seeds mixture;

(2) the basis of the seeds mixture used in sowing land down to grass must be :

20 lb. Ryegrasses	} Per statute acre
3 lb. Cocksfoot	
3 lb. Timothy	
$\frac{1}{2}$ lb. Wild	
White Clover	

(3) land which is being sown down to grass and which has been cropped only with cereals or flax must receive a dressing of 3 cwt. British Superphosphate or 1 cwt. American Superphosphate or 5 cwt. Basic Slag, Ground Rock Phosphate or Semsol per statute acre.

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Progress Report on Stormont Laying Test

Another test, the twenty-fourth in the series, began on 1st October, 1945 and will continue for forty-eight weeks. The number of pens, each of six birds, accepted was 140 which is ten more than in the previous test. Unfortunately, all the entries could not be accepted as none of the remaining runs was considered suitable for the immediate accommodation of birds.

The breeds represented and the number of birds of each breed in the new test are stated in the table below.

For the purpose of reporting progress the full forty-eight weeks during which the test will continue will be divided into twelve periods of four weeks each and a report issued at the end of each of these periods.

The first period ended on 28th October and the average egg production of the birds of the different breeds during the four weeks is given in the following table :

Breed	No. of Pullets accepted	Average Number of eggs per Pullet laid
Buff Rock ...	128	9.61
Light Sussex ...	120	7.38
White Leghorn ...	186	6.94
White Wyandotte ...	72	6.88
Rhode Island Red ...	348	6.60
Exchequer Leghorn ...	12	6.33
Brown Leghorn ...	24	5.37
Black Leghorn ...	36	3.80
Ancona ...	6	2.66
Barred Rock ...	6	—
Welsummer ...	6	—
Silver Grey Dorking	6	—
Average for all birds	(840)	6.54
Average for previous test ...	(780)	6.50

At the end of the four weeks a pen of Rhode Island Red pullets, the property of Mrs. J. Armstrong, Ballindullagh, Irvinestown, Co. Fermanagh, held first place in the entire test. A pen of White Leghorn pullets owned by Mr. G. S. Shaw, Magheramorne, Co. Antrim, held second place, while a pen of Rhode Island Reds, the property of Miss M. Thompson, Lisnoe, Lisburn, Co. Down, was third.

The following are the owners of the leading pens in each section of the test :

White Wyandotte :

1. Mrs. J. Warrington, Lakeview, Newtownhamilton, Co. Armagh.
2. Mrs. E. M. Rea, Tullynagowan, Brookeborough, Co. Fermanagh.

White Leghorn :

1. Mr. G. S. Shaw, Magheramorne, Co. Antrim.
2. Mr. S. Phillips, Tobermore, Co. Londonderry.

Rhode Island Red :

1. Mrs. J. Armstrong, Ballindullagh, Irvinestown, Co. Fermanagh.
2. Miss M. Thompson, Lisnoe, Lisburn, Co. Down.

Buff Rock and Black Leghorn :

1. Miss C. C. Meara, Tullaghbeg, Dungannon, Co. Tyrone. (Buff Rock.)
2. Rev. C. O. Weir, Anaghlonge, Banbridge, Co. Down. (Buff Rock.)

Any other Utility breed :

1. Miss D. Robertson, Dogleap, Limavady, Co. Londonderry. (Light Sussex.)
2. Mr. & Mrs. Thompson, Ballyboyland House, Ballymonee, Co. Antrim. (Light Sussex.)

Matters of the Moment

1. The reduction in the tillage quota must not be taken to mean that the need for growing food crops has in any way decreased. Every acre that it is possible to utilise for producing crops that can be used as food for man, beast or bird, must be kept under the plough. There is an urgent need for full production of milk, meat, bacon and eggs, and the only way to achieve this is by producing the maximum quantity of livestock foods.

2. Early and good ploughing are forerunners of good crops. No opportunity should be missed of preparing the way for the plough by clearing the fields of potatoes and by trimming hedges, etc. The ploughing of stubble and lea ground should be completed as soon as possible.

3. Cart out now all available well-rotted farmyard manure to stubble land intended for potatoes and roots, and plough it down as soon as it has been spread. This will greatly reduce the work next spring and will give just as good results as would be obtained if the manure were applied in the drills.

4. Where it is the intention to apply lime to land that is being sown out, supplies should be ordered immediately. As soon as the land has been ploughed the lime should be applied. If orders are not placed until the spring, very often supplies are not available then, and even if the lime can be obtained there is seldom time to apply it at that season.

5. The way to make sure of having adequate artificial manures for next year's crops is to take delivery of the manures as soon as the merchant offers supplies, and to store them on the farm until required. There will be a grave risk of shortage of manure next spring if this is not done. It pays well to store the manures on the farm as the price advances each month. See that sufficient manure is obtained to give all the crops a generous dressing.

6. Only by planting properly sprouted seed potatoes can full yields be obtained. All seed should be set up before Christmas to sprout. Only by so doing will it be possible to ensure that the first sprouts, which are the most vigorous, can be retained. The difference in yield between well-sprouted seed and those which are not sprouted may be as much as $1\frac{1}{2}$ tons per acre. Plan to safeguard the seed against frost.

7. Plan to sow a suitable mixture of the best available grass and clover seeds next spring, and order supplies from a reliable firm immediately. Remember that grass is the most important crop on the farm and that no farmer can afford to risk poor grazing by sowing inferior seed or an unsuitable mixture which will not produce good pasture. The fertility of the soil must be high to obtain good grazing, even from good seeds.

8. At this season of the year dairy cows, especially those in full production, are liable to contract "founder" if they are allowed to remain out-of-doors in adverse weather. This must be guarded against as animals thus affected generally give little milk for the remainder of the season. Remember that dairy cows are much better in a byre in cold, wet weather, than standing at a gate.

9. Make certain that the winter calvers are in good condition at calving time. If they are not they will not give the yields of which they are capable. In addition to fodder and green food an allowance of concentrates should be given for the last six weeks before they are due to calve. The amount to be given should be determined by the condition of each cow.

10. Poultry keepers are strongly advised to rear their chickens early. Those who wait to do so until May and June are bound to be disappointed. It is well known that late hatched chickens are seldom profitable.